Postings: from the Desk of Jim Brodrick

What a week! As Washington digs out from under several feet of snow, I'm grateful that there were only a few inches on the ground in Raleigh last week, at the DOE Solid-State Lighting R&D Workshop. The turnout in Raleigh was excellent - 350 attendees, despite the cold weather. As the world's first LED City, with three years of experience using SSL under its belt, Raleigh offered the perfect setting for our workshop, and we took full advantage of that with a guided walking tour the first evening.

Raleigh assistant city manager Dan Howe led us on a whirlwind tour of six LED lighting installations featuring more than 1000 LED fixtures. Workshop attendees got to see the fruits of their labors firsthand, in real-life settings that ranged from parking garages, to downtown streets, to an ice-skating rink. It was gratifying to see in person how far SSL has come, both from a technological standpoint and an economic one. While Dan reported that user feedback to date has been overwhelmingly positive, he also emphasized that his municipality's embrace of LED lighting is not due to whimsy or idealism, but rather to a tough-minded, bottom-line approach: they won't install anything that doesn't pay for itself. I was struck by Dan's candor, as he shared lessons learned in a city that was an early pioneer in LED lighting installations and continues to pilot new applications. There is much here to share with other municipalities across the country.

At the workshop, I was equally struck by the candor of Mark Schulkamp, who shared his perspective as an electrical contractor. As the buck-stops-here guy whose job it is to "make it work," he observed that LED lighting products don't always live up to their promises, such as being dimmable or being "plug and play" - and that this leaves him (and his fellow electrical contractors) with all sorts of unanticipated obstacles to overcome. This same point - essentially, the need for SSL products to be easily installable and easily serviceable - was reinforced in a presentation by lighting

designer Naomi Miller.

Another issue that echoed throughout the workshop was reliability. A panel discussion on this topic was the first opportunity for many attendees to hear about what's being done by a DOE-industry working group on lifetime and reliability, and the guidelines they expect to publish in the coming months. Panelist Kevin Dowling of Philips Color Kinetics pointed out that reliability and lifetime are not issues that can be tackled individually, but require a collaborative, industry-wide effort, because even a few bad apples can spoil the whole barrelful. David Szombatfalvy from GE Lighting Solutions described a process for defining lifetime that uses a "scorecard" to roll up available supplier data and field data, while Mark Hodapp of Philips Lumileds Lighting stressed that system reliability has to be designed into the product. And Terry Clark of Finelite pointed out the importance of color quality and consistency over the life of the product - a somewhat different take on reliability, but one that was frequently mentioned by many speakers and participants throughout the week.

This panel drew a lively response in the Q&A session that followed - as did the other panels, presentations, and track sessions on LED and OLED issues. The heart of our discussions during the workshop, however, had to do with exploring new pathways to improve the efficacy and performance of SSL technology, and answering the question: What are the limits?

In his keynote talk, Shuji Nakamura of the University of California, Santa Barbara answered that question by detailing multiple threads being explored in the labs at UCSB. Shuji and his team are working to better understand the "green gap" issue, prevent efficiency droop, improve extraction efficiency, develop high quantum efficiency phosphors, and explore bulk growth of GaN. According to Shuji, it will take improvements in all of these areas to achieve the full energy-saving potential of solid-state lighting. While DOE's current efficacy target is 200 lm/W for LED devices, I was encouraged to hear that the team at UCSB is aiming for 250 lm/W. As author Arthur Clarke said, "The only way of discovering the limits of the possible is to venture a little way past them into the impossible."

Shuji was followed by a panel of LED and OLED lighting experts who are doing just that - exploring ways to climb, knock down, or bypass

whatever "wall" blocks our progress. We heard more about methods to increase LED efficacy. Several speakers targeted more work on improving the efficiency of the color spectrum as a way to move forward. Others noted the need to work on a variety of improvements from a luminaire perspective. OLED panelists resonated with the need to increase OLED brightness to meet the cost imperatives of lighting, but clearly identified improvements in outcoupling as the most urgent task for improved efficacy.

We also heard detailed presentations on nine DOE R&D projects, selected to receive special recognition at the workshop for their work to advance LED and OLED technology. The track sessions that followed opened up the discussions even further, with contributions from many of our attendees. This feedback from participants informs updates to the DOE SSL Multi-Year Program Plan, and we value the involvement and input from industry, national laboratories, academia, and research institutions in this process. A big thanks to all for your participation in Raleigh.

As always, if you have questions or comments, you can reach me at postings@lightingfacts.com.